

AMENDMENT UNDER 37 C.F.R. § 1.111  
U. S. Application No. 09/943,352

**REMARKS**

Claims 1-16 are all the claims pending in the application.

Claims 1-16 are pending in the application. Applicant adds new claims 17-28 by this Amendment. Claims 1, 3/1, 4/1, 9, 11/9, and 12/9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Hosoi et al. (Jpn. Unexam. Patent Publ'n. No. 1 (1989)-10540) ("Hosoi") in view of Yip et al. (U.S. Patent No. 5,039,854A) ("Yip") and Kulpinski et al. (U.S. Patent No. 4,778,995A) ("Kulpinski") and Conrad et al. (U.S. Patent No. 4,778,994A) ("Conrad"). Claims 2, 3/2, 4/2, 10, 11/10, and 12/10 are rejected under 35 U.S.C. §103(a) as being unpatentable over Hosoi in view of Yip and Kulpinski. Claims 5-8 and 13-16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicant adds new claims 17-28 to more particularly claim the invention and to submit the following arguments to traverse the prior art rejections.

**Applicant's Invention**

Applicant's invention relates to a radiation image read-out method and apparatus. In an embodiment, stimulating rays are irradiated on to a stimulable phosphor sheet, on which a radiation image has been stored, and light which is emitted by the stimulable phosphor sheet is photoelectrically detected, and an image signal representing the radiation image is thereby obtained. Specifically, the embodiment has stimulating rays linearly radiated on to the stimulable phosphor sheet, and a light emitted by the stiumulable phosphor sheet is detected with a line sensor.

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Hosoi discloses an image information reader using photodetecting means. A laser light source scans the surface of the sheet and stimulated luminescence based upon the radiation of the laser beam is photoelectrically detected by a line sensor.

Yip relates to a multistage fluorescent radiation collector which collects radiation emitted from an image storage medium. Yip discloses the use of a radiation collector with a number of light-pipe members. Each light pipe member has a fluorescent dye which absorbs radiation from the storage medium and emits radiation of another wavelength. Each of these light pipe members channel the radiation absorbed from the storage medium towards the ends of the fluorescent radiation collector.

Kulpinski relates to an apparatus for reading out an image stored in the transparent stimulable phosphor sheet. The apparatus includes means for maintaining a layer of optical index matching fluid between a light detector and the transparent stimulable phosphor sheet. The layer of fluid provides optical contact between the light detector and the transparent stimulable phosphor.

Conrad relates to an apparatus for converting image information generated by radiation incident on a storage layer into an electrical signal sequence.

I. Rejection of Claims 1, 3/1, 4/1, 9, 11/9, and 12/9 over Hosoi in view of Yip, Kulpinski, and Conrad

Applicant submits that the Examiner has not established a prima facie case of obviousness because the combination of references impermissibly renders Hosoi unsatisfactory for its intended purpose. By referring to a combination of references used to reject apparatus claim 9, the Examiner states that:

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[i]n view of the high efficiency of the fluorescent light guide device of Yip *et al.*, and the art-recognized equivalence of a transparent light guide as shown by Conrad *et al.*, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Hosoi *et al.* to have it comprise a light guide device between the stimulable phosphor sheet 10 and the line sensor 17 such that the line sensor 17 was arrayed along at least one end face of the light guide device in accordance with the suggestion of Kulpinski *et al.* that the end face at which the line sensor is arrayed may be parallel to the main scanning direction corresponding to the X direction in Hosoi et al."

Applicant respectfully disagrees because the above combination would not permit the line sensor 17 of Hosoi to detect light, as originally intended.

First, the Examiner states that the light pipe 132 of Yip discloses the recited light guide device. The light pipe 132 of Yip, however, is designed to emit red radiation which is internally reflected to the ends of the light pipe to be sensed by radiation sensors (col. 8, lines 43-45). By taking the scanning beam 116 as a point of reference, the light in the light pipe 132 travels in the main scanning direction. Therefore, to detect the light traveling out of the ends of the light pipe 132, a line sensor must be arranged parallel to the ends of the light pipe, i.e., perpendicular to the main scanning direction. If the line sensor is arrayed parallel to the main scanning direction, then no light would be detected due to total internal reflection (col. 8, lines 43-45) along the walls of the light pipe 132 parallel to the main scanning direction. Although Kulpinski discloses an array of light sensors along the edges of a light guide, the reference does not disclose, suggest, or provide motivation for the line sensor 17 being arrayed at an end face parallel to the main scanning direction with respect to the light pipe 132. Therefore, combining the references in the manner presented by the Examiner would only render Hosoi unsatisfactory for its intended purpose of detecting light. Thus, Applicant submits that the combination of references is improper to reject claim 1.

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Also, Applicant submits that the combination of references, individually, or in combination fails to disclose the step of “linearly irradiating stimulating rays onto an area of a stimulable phosphor sheet.” Hosoi teaches the light source 61 in FIG. 4 as emitting a single dot-like beam of light, and thus cannot perform the step of linearly irradiating stimulating rays.

Claims 3/1 and 4/1, which depend from claim 1, are patentable for at least the above arguments of claim 1.

Alternatively, or in addition, the combination of reference cannot be properly combined to reject claims 3/1 and 4/1 because Kulpinski teaches away from what is taught by Hosoi. Hosoi teaches the use of a fluorescent sheet 10 conveyed in the arrow Y direction with respect to the line sensor 17 (Abstract). In Kulpinski, however, Figs. 16 and 17 indicate that the phosphor sheet remains fixed and is not conveyed. Kulpinski states that “[t]he principle of the present invention may also be applied to apparatus where the light detector is fixed with respect to the phosphor sheet.” (col. 7, lines 19-21), and discloses that optical contact can be provided by a layer of index matching liquid or a layer of optical cement, since there is no relative movement between the phosphor sheet 10 and the light sensors 26 (col. 7, lines 24-28). The phosphor sheets in Figs. 16 and 17 are described as being in optical contact with the light guide, and the light sensors as being in optical contact with the light guide (col. 7, lines 29-46). Therefore, using the line sensors 26 in the manner disclosed by Kulpinski would require a continuity of optical contact between the line sensor 17 (of Hosoi) and the line sensor 17 which necessitates fixing the position of phosphor sheet 10 with respect to the line sensor 17. Further, there is nothing in the Kulpinski which indicates any sort of movement between the phosphor sheet 10

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and light sensors 26 in Figs. 16 and 17. Hosoi, however, teaches that the fluorescent sheet 10 is conveyed in the subscanning direction (FIG. 4).

As for claim 9, the Examiner has not established a prima facie case of obviousness for the reasons above. Namely, the combination of the irradiating means 61 and line sensor 17 of Hosoi, the light pipe 132 of Yip, the light conductor 34 of Conrad, and the light guide 24 and the light sensor 26 of Kulpinski renders Hosoi unsatisfactory for its intended purpose. Therefore, the combination of references is not proper and fails to render the claim obvious.

Claims 11/9 and 12/9, which depend from claim 9, are patentable for at least the above arguments for claim 9.

Alternatively, or in addition, the references cannot be properly combined to reject claims 11/9 and 12/9 because the fixed orientation of the phosphor sheet in Kulpinski effectively teaches away from the conveyed fluorescent sheet of Hosoi, as discussed above for claims 3/1 and 4/1.

II. Rejection of claims 2, 3/2, 4/2, 10, 11/10, and 12/10 over Hosoi in view of Yip and Kulpinski

Claims 2 and 10 are patentable for reasons similar to those submitted above for claims 1 and 9. Namely, Applicant submits that the combination of references renders Hosoi unsatisfactory for its intended purpose and thus do not establish a prima facie case of obviousness.

Claims 3/2 and 4/2, and claims 11/10 and 12/10, which depend from claims 2 and 10, respectively, are patentable at least for the above arguments of claims 2 and 10.

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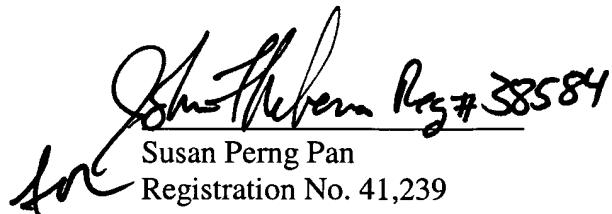
Alternatively, or in addition, claims 3/2, 4/2, 11/10, and 12/10 are patentable for the reasons argued for claims 3/1, 4/1, 11/9, and 12/9, that the fixed position of the phosphor sheet in Kulpinski teaches away from the conveyed phosphor sheet of Hosoi.

New claims 17-28 are added and do not add new matter. For example, the light guiding sheet 16F is divided into pixels (page 32, lines 15-18) and FIGS. 2 shows the light 14 inside the light guide 16 being reflected toward the end faces, to support claims 17-20 which recite that "the light guide device is divided into a plurality of sections . . . , wherein each section channels a portion of the light received toward the end faces of the light guide device."

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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